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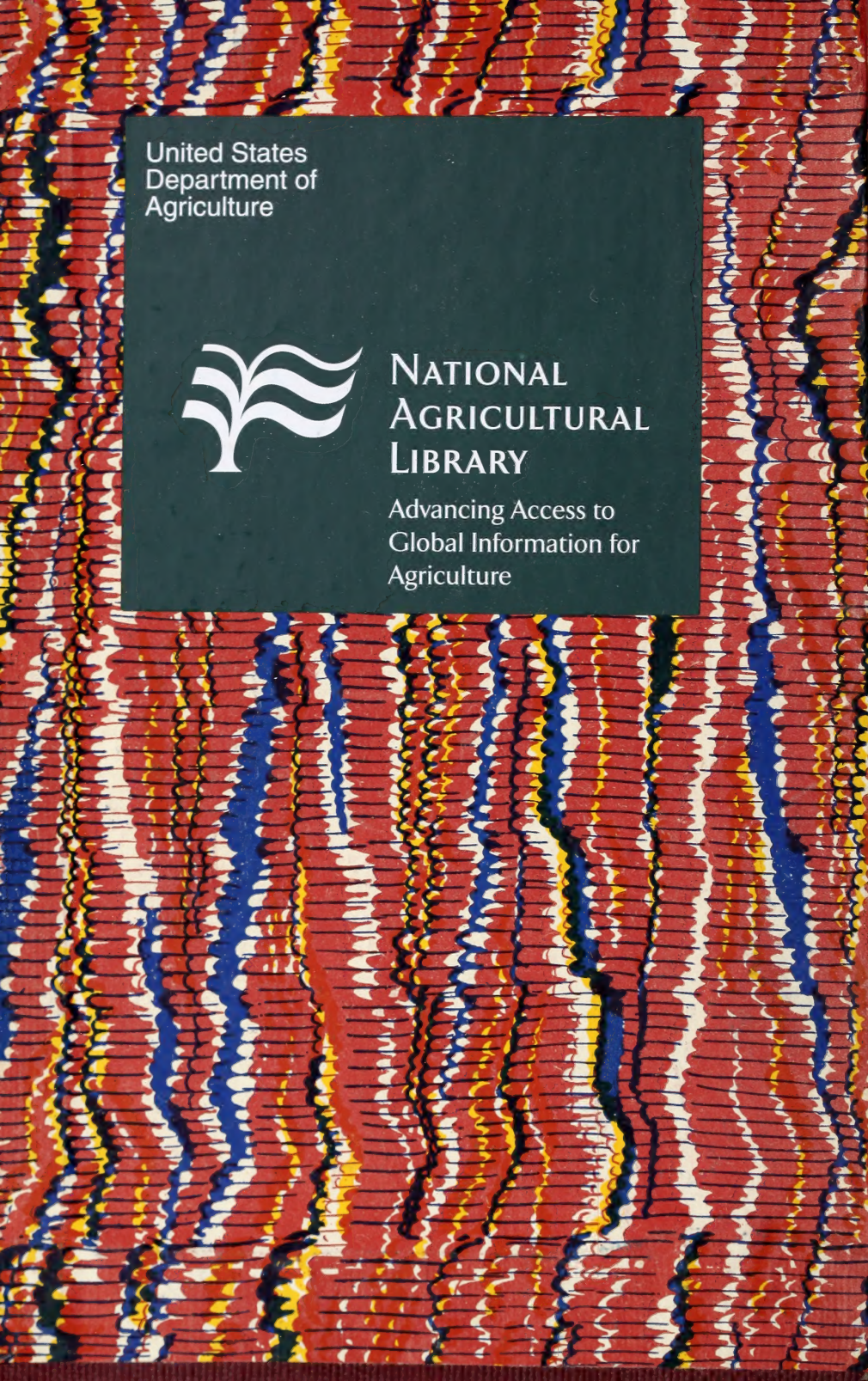
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UNITED STATES DEPARTMENT OF AGRICULTURE

BULLETIN No. 526

Contribution from the Bureau of Plant Industry
WM. A. TAYLOR, Chief

Washington, D. C. PROFESSIONAL PAPER August 28, 1918

EXPERIMENTS WITH SINGLE-STALK COTTON CULTURE IN LOUISIANA, ARKANSAS AND NORTH CAROLINA

By

P. V. CARDON, Assistant Agronomist

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THE RESULTS presented in this report were obtained in 1915 under an informal cooperative agreement between the Office of Acclimatization and Adaptation of Crop Plants, of the Bureau of Plant Industry, and the Office of Extension Work in the South, of the States Relations Service.

The writer wishes to acknowledge the cordial cooperation of the various State, district, and county agents of the last-named office and the assistance rendered by the many farmers who were interested in the experiments.

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Assistant Agronomist, Office of Crop Acclimatization.

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IMPORTANCE OF SINGLE-STALK COTTON CULTURE.

Single-stalk cotton culture was first announced as a new system in 1913, and at that time also its principles were outlined.[1] Since that year three additional publications [2] have been issued, which present results obtained in 1913 and 1914 from experiments with the system in Virginia, South Carolina, and Texas. The purpose of this report is to present the results obtained in 1915 from a series of experiments conducted in the States of Louisiana, Arkansas, and North Carolina.

The single-stalk system is based on the recognition of a fact that has not been taken into practical account in most of the cultural

[1] Cook, O. F. A new system of cotton culture. U. S. Dept. Agr., Bur. Plant Indus. Cir. 115, p. 15-22, 1913.

[2] Cook, O. F. A new system of cotton culture and its application. U. S. Dept. Agr., Farmers' Bul. 601, 12 p., 2 fig. 1914.

Cook, O. F. Single-stalk cotton culture. U. S. Dept Agr., Bur. Plant Indus. [Misc. Pub.] 1130, 11 p., 12 fig. 1914.

Meade, R. M. Single-stalk cotton culture at San Antonio. U. S. Dept. Agr. Bul. 279, 20 p., 3 fig., 6 pl. 1915.

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experiments that have been made with cotton, namely, that the cotton plant has two distinct kinds of branches, vegetative and fruiting, and that the relative growth of these can be controlled by cultural methods. Single-stalk cotton culture differs from systems usually employed in two essential features, namely, the time of thinning and the spacing of plants in the row. Where the usual methods involve thinning the seedlings soon after complete germination and spacing to distances varying with the locality from 12 to 30 or more inches, single-stalk culture involves later thinning and closer spacing, down to 6 inches, or even less under some conditions.

The purpose of the later thinning is to suppress the development of vegetative branches, which usually are produced at the lower nodes of the main stalk. If cotton plants are left close together in the row during the early stages of their growth, few vegetative branches are likely to develop, for the buds at the lower nodes of the main stalks remain dormant, and only fruiting branches appear at the upper nodes. So in applying single-stalk culture, thinning is delayed until after the suppression of vegetative branches has been accomplished and until fruiting branches are expected to appear. Then the plants are spaced only far enough apart to allow for the normal development of the fruiting branches. The distance at which single-stalk plants may be spaced to advantage will depend upon local conditions, differing with soil and climate and the variety used, but, owing to their narrow, erect form the plants may be left much closer together than usual without danger of injurious crowding. In fact, single-stalk rows usually are less crowded than those in which the plants, thinned early and wide spaced, have been allowed to develop fully their long basal limbs, which often equal or even exceed in size the main stalk of the plant.

Owing to the suppression of excessive vegetative growth on single-stalk plants, they usually reach maturity in a shorter time than the more bushy plants. While fewer bolls per plant may be produced, single-stalk rows usually contain a greater total number of bolls and hence give larger row yields than rows grown by the usual systems of culture. Another important feature of single-stalk culture is that, where later thinning is practiced, greater protection is afforded against damage from inclement weather or other injuries to which the seedlings are subject, particularly leaf-cut or tomosis.[1] An additional advantage of later thinning lies in the opportunity to take out weak or injured plants when the thinning is done, so that only normal individuals are left, a condition which increases the yield and earliness of the crop.

[1] Cook, O. F. Leaf-cut, or tomosis, a disorder of cotton seedlings. *In* U. S. Dept. Agr., Bur. Plant Indus. Cir. 120, p. 29–34, 1 fig. 1913.

The success attained in early experiments with single-stalk culture led to a belief that it should prove advantageous under a variety of conditions existing in the cotton belt. The idea of suppressing the vegetative branches was first developed and applied in connection with the production of Egyptian cotton in the Southwest, where it proved to be of distinct value in checking the rank growth of the plants, which for a time threatened the success of the industry.[1] Later, at Norfolk, Va., where the season is relatively short, single-stalk culture gave significantly larger and distinctly earlier yields than the older methods with which it was compared. Similar results have since been obtained in South Carolina with both Sea Island and Upland cotton, and also in Texas, where the most striking advantages have been shown under extreme conditions both of drought and of weevil infestation. These early experiments showed that the system could be used to advantage under a very wide range of conditions, but a large amount of experimental work still remains to be done in order to determine how to secure the best results with the system under any given combination of local conditions of soil, season, and variety of cotton.

The results of these experiments indicate that single-stalk culture may be profitably applied under a wide range of natural conditions, but definite recommendations can not be made for all localities, as it is recognized that a thorough knowledge of local conditions and familiarity with the new system are essential to its successful application. It is not expected that experiments with the new system will show advantages under all conditions, and in some instances unfavorable results may be secured, as has been recorded by the Bureau of Entomology in connection with tests conducted by that Bureau in Louisiana in 1915. Such cases may enable the experimenter to understand the nature and practical limitations of the system and to determine under what conditions of climate, soil, etc., it may be a desirable method for the cotton grower to adopt.

LOCALITIES WHERE EXPERIMENTS WERE MADE.

The present experiments were located in the States of Louisiana, Arkansas, and North Carolina. The parishes and counties in which the work was done, the farmers conducting the experiments, their post-office addresses, and the agents cooperating are listed in Table I.

[1] For a general statement of the cultural difficulties encountered and the means employed in surmounting them, see Scofield, C. S., Kearney, T. H., Brand, C. J., Cook, O. F., and Swingle, W. T., Community production of Egyptian cotton in the United States, U. S. Dept. Agr. Bul. 332, 30 p. 1916.

TABLE I.—*List of localities where experiments in single-stalk cotton culture were conducted in 1915, showing cooperators therein.*

State and parish or county.	Farmer.	Address.	County agent.
Louisiana:			
Pointe Coupee	John Hebert	Ventress	Felix Dabadie.
Do	Alfred Robillard	do	Do.
Madison	Killarney Plantation	Mounds	T. I. Watson.
Do	R. K. Boney	Duckport	Do.
Do	R. C. Webb	Delta Point	Do.
Bossier	Essie Jackson	Benton	E. S. Burt.
Do	W. B. Wilbourn	do	Do.
Caddo	C. C. Herndon	Shreveport	A. J. Scott.
Do	William Mercer	Gilliam	Do.
Jackson [1]	L. M. Calhoun, jr.	Gilbert	L. M. Calhoun.
Arkansas:			
Miller	D. R. Akin	Fouke	T. F. Lueker.
Do	J. E. Tanner	Texarkana	Do.
Do	W. B. Latta	do	Do.
North Carolina:			
Edgecombe	W. K. Benson	Battleboro	Zeno Moore.
Do	L. L. Draughon	Whitakers	Do.
Do	W. R. Felton	Conetoe	Do.
Sampson	H. D. Sloan	Ingold	MacD. Davis.
Do	W. I. Wright	do	Do.
Do	L. F. Green	do	Do.
Duplin	L. M. Sanderson	Warsaw	D. J. Middleton.
Craven	J. L. Roper	Riverdale	J. W. Sears.
Do	B. C. Peterson	Vanceboro	Do.

[1] Three experiments were conducted at this point. When the farms were visited on August 13, 1915, the conditions all appeared favorable to single-stalk culture. However, repeated requests have failed to bring any report of the final results obtained, so these experiments can not be included herein.

In the case of some of the farmers listed in the table, as will be pointed out later, relatively poor stands were obtained, for which certain allowances must be made. In most of the cases in which the stands were uniformly good, a fairly adequate comparison of methods was possible; but in others, as will be shown, thinning certainly was done too late to secure the best results, and in some instances the crop may have been injured in this way.

METHODS OF PROCEDURE.

SELECTION OF COOPERATORS.

The county agents selected from among the farmers in their respective counties (or parishes) a few of those who were most interested and gave evidence of being able to carry out instructions. They are not necessarily the best farmers in their respective counties, but they are representative of the better farmers. Their farms are so distributed as to afford conditions fairly typical of those over a large part of each State, except in the case of Arkansas, where flood damage resulted in the abandonment of most of the experiments that were begun. Although the experiments in North Carolina were confined to the eastern district, a large part of the total cotton-growing acreage of the State is represented. In Louisiana, experiments were conducted in sections typical of the larger areas of the State where cotton is grown.

PLAN OF THE EXPERIMENTS.

The county or parish agents were requested to make arrangements with the farmers for conducting the experiments on ordinary fields of cotton, planted and cultivated in the usual manner. It was suggested that a more accurate comparison of the systems of culture employed would be possible if the methods were compared in alternate rows and in alternate blocks of 4 or 5 rows. To do this it would be necessary to thin at the usual time each alternate row or block and leave the others for later thinning. In several instances this plan was followed, but in some instances comparisons were made only in alternate rows. In one case in Louisiana an entire acre, located in the center of a field of several acres, was grown by the single-stalk method.

THINNING SINGLE-STALK ROWS.

Any intelligent grower, after a little careful observation, can tell when to thin; but for the purpose of these experiments it was considered more dependable actually to demonstrate the method than merely to issue written instructions. Accordingly, some one familiar with the new system directed the thinning of the single-stalk rows in most of the experiments. The few farmers whose farms it was impracticable to visit at this time thinned according to written instructions, and these experiments were, with one or two exceptions, fairly dependable.

The general advantage obtained in applying single-stalk culture is the suppression of vegetative branches. The distance at which the plants should stand in the row is a secondary consideration and must be regulated to suit local conditions, but as a rule the largest yields have been obtained with the plants much closer together than is now customary. Accordingly, the plants in the single-stalk rows of these experiments were spaced 6 to 10 inches, the standard aimed at being about 8 inches. The plants as thinned by the farmers in the old-method rows were variously spaced, according to usual practice, 18 to 36 inches.

RECORDING THE YIELDS.

The recording of yields in each case was left with the farmer, who in some instances was assisted by the county agent. However, it was requested that the yield from each row at each picking be recorded separately, and blanks for this purpose were furnished. Row yields were reported by 17 of the 21 farmers, while only total yields were reported by 4 farmers. The general rule followed was to have the picking done from only one row at a time and have the yield of that row recorded before proceeding to the next.

RESULTS OBTAINED.

As these experiments were largely demonstrational, it is of chief importance to consider their economic phases. While more detailed reports of the flower counts, boll counts, branch measurements, etc., would be of interest from the standpoint of a scientific consideration of the factors involved, these data are treated only incidentally in this report. The interest at this time lies in knowing whether single-stalk culture increased the yield of seed cotton, whether it had any effect on the percentage of lint, and whether the quality of the lint was in any way affected.

YIELDS OF SEED COTTON.

The experiments are herein discussed by States, in the following order: Louisiana, Arkansas, North Carolina. In presenting the yields of seed cotton obtained, each experiment is first considered in detail, apart from the others. A summary table, bringing together the total yields of all the experiments, is then presented to facilitate comparisons.

LOUISIANA.

The nine different experiments conducted in Louisiana, all under boll-weevil conditions, are considered by parishes, as follows: Pointe Coupee, in the south-central part of the State; Madison, in the northeastern part; Bossier and Caddo, in the northwestern part.

POINTE COUPEE PARISH.

Two experiments were conducted in Pointe Coupee Parish, on the farms of Messrs. John Hebert and Alfred Robillard, near Ventress. They were about a quarter of a mile apart. Both are located on sandy soil, typical of that drained by the Mississippi River in this part of Louisiana, and in each instance the cotton was planted on low beds in rows 4½ feet apart. Unfavorable weather influenced both crops early in the season, wet weather during March being followed by drought.

The Hebert experiment.—Mr. John Hebert planted Sugarloaf cotton on May 10, which was considered unusually late in this section. He planted at the rate of 25 pounds per acre, which was heavier than usual. Germination was good, and an almost ideal stand was secured. Single-stalk culture was compared with the usual method in alternate rows, there being 14 rows of each.

The old-method rows were thinned on May 25, when the plants, 3 to 4 inches high and with 2 to 3 leaves, were spaced about 18 inches apart. When the single-stalk rows were thinned on June 6, the plants were 10 to 12 inches high and had 6 to 8 leaves. They were spaced 6 to 10 inches apart. Had the thinning of the single-stalk rows been done a little earlier, it is likely that it would have been

better, but, as Table II shows, significant differences in yield were obtained. Only the total yields of each picking were reported.

TABLE II.— *Yields, obtained in a single-stalk culture experiment with cotton conducted in 1915 by John Hebert, Ventress, La.*

Spacing system.	Yield of seed cotton (pounds).		
	First picking.	Second picking.	Total.
Single-stalk rows, thinned June 6	505	350	855
Old-method rows, thinned May 25	380	300	680
Difference:			
Pounds	125	50	175
Per cent	32.9	16.7	25.7

Table II shows single-stalk culture to have had a marked advantage from the standpoint of earliness as well as of total yield. Single-stalk culture yielded 32.9 per cent more cotton at the first picking than the old method, and 16.7 per cent more at the second picking. This gave an increase in total yield of 25.7 per cent.

The Robillard experiment.—Mr. Robillard planted Bank Account cotton on May 6, using only 15 pounds of seed per acre. Only a fair stand was obtained; the seedlings were somewhat scattered and in some rows there were short skips. This made it impossible to apply single-stalk culture to the best advantage. Moreover, Mr. Robillard spaced the plants in the single-stalk rows farther apart than was recommended. There were 20 rows in the experiment, the two systems of culture being compared in alternate rows.

The old-method rows were thinned on May 19, when the plants were 4 to 5 inches high and had 2 to 3 leaves; the single-stalk rows were thinned on June 8, when the plants were about 10 inches high and had 7 to 8 leaves. The plants in the old-method rows were spaced 18 to 24 inches apart, and in single-stalk rows 10 to 12 inches.

Three pickings were made in this experiment, and the yields are reported in Table III. Only the total yields of each picking were reported.

TABLE III.—*Yields obtained in a single-stalk culture experiment with cotton conducted in 1915 by Alfred Robillard, Ventress, La.*

Spacing system.	Yield of seed cotton (pounds).			
	First picking.	Second picking.	Third picking.	Total.
Single-stalk rows, thinned June 8	226	211	169	606
Old-method rows, thinned May 19	177	178	134	489
Difference:				
Pounds	51	33	35	117
Per cent	28.8	18.6	26.1	23.9

Table III shows that the increase in yield from each picking favored single-stalk culture by 28.8, 18.6, and 26.1 per cent, respectively, giving a total increase of 23.9 per cent.

MADISON PARISH.[1]

Three experiments were conducted in Madison Parish, located at intervals of about 5 miles between Tallulah and Delta Point, the latter bordering on the Mississippi River. Two of these were on sandy alluvial soil, and the other was on heavy buckshot soil, both soils being fairly representative of types found in that section, known as the Delta. In all cases the cotton was planted on low beds in rows about 4 feet apart. Spring conditions were unfavorable generally, a wet March being followed by drought through April and May.

The Killarney experiment.—This experiment was on buckshot soil located on the Killarney Plantation, at Mounds. Owing to the poor stand obtained from the first planting, a second planting of Simpkins cotton was made on April 15, and a fairly good stand was secured. On June 3, a few plants from the first planting were visible in the single-stalk rows and it was suggested that at thinning time, about a week distant, these older plants be removed, since there were enough of the younger plants for single-stalk purposes. To leave the older ones would have resulted in nonuniformity. Mr. T. I. Watson, parish agent, directed this later thinning.

The old-method rows were thinned on May 22, when the plants, 4 to 6 inches high and with 3 to 5 leaves, were spaced 18 to 30 inches apart. The single-stalk plants, thinned on June 12, when they were 8 to 10 inches high and had 6 to 8 leaves, were spaced 8 to 10 inches apart.

In practically all of the rows of this experiment there were a few skips 3 feet or more in length. Toward the end of the season the skips appeared to be greater in the aggregate in the wide-spaced rows than in the single-stalk rows, and this was doubtless a factor in the increased yields, as often occurs with the new system. Prior to the time of thinning the wide-spaced rows, the stand of all the rows was so uniform that no appreciable differences in the number and length of skips per row were perceptible. Any differences of soil

[1] In reporting the yields from the experiments made in Madison Parish, Parish Agent T. I. Watson told of the results of an informal experiment with single-stalk culture conducted on his own initiative by Mr. N. C. Williamson, of Millikin, East Carroll Parish, La. Mr. Williamson applied single-stalk culture on 2 acres. Of the yields obtained, Mr. Watson said:

I was at his [Williamson's] place on November 24 and secured his yield, which was 1,300 pounds of lint from the 2 acres, or an average of 650 pounds of lint per acre. His general crop is making about 1,280 pounds of seed cotton per acre, or 80 bales on 100 acres. Mr. Williamson does not consider that he carried out the method fully enough to be recognized as an experiment, but thinks well of it and says he is going to try it out next year.

Mr. Williamson's crop of 80 bales of lint from 100 acres is equivalent to about 400 pounds of lint per acre. Compared with this, as reported by Mr. Watson, the 2 acres of cotton grown by the single-stalk method yielded an average of 650 pounds of lint. On the basis of these figures, it is seen that single-stalk culture yielded 250 pounds of lint per acre, or about 62 per cent, more than the old method.

or other local conditions would tend to be equalized by the alternate-row method of comparing the two systems of culture. But more numerous and wider skips often appear in wide-spaced rows on account of injury to seedlings, due to greater exposure in the early stages of their development. Fewer plants are injured in single-stalk rows because of the mutual protection afforded by the thick-standing seedlings, and such injuries as occur are rendered unimportant because enough plants remain to thin as desired. This feature has been previously pointed out as one of the many advantages of later thinning.[1]

There were 16 rows in the experiment, the two systems being compared in alternate rows. Two pickings were made, but the yields from only the first picking were reported. These are shown in Table IV.

TABLE IV.—*Row yields of the first picking obtained in a single-stalk culture experiment with cotton conducted in 1915 on the Killarney Plantation at Mounds, La.*

Row.	Yield of seed cotton (pounds).		Row.	Yield of seed cotton (pounds).	
	Single stalk.	Old method.		Single stalk.	Old method.
No. 1	35	29	No. 7	38	27
No. 2	43	28	No. 8	33	20
No. 3	33	24			
No. 4	38	26	Total	287	207
No. 5	35	25	Difference	80	.....
No. 6	32	28	Increase .....per cent..	39	.....

Table IV shows that in this experiment single-stalk rows yielded more cotton in every instance than adjoining old-system rows, the total increase for the first picking being 39 per cent. Judging by the appearance of the rows in August, when counts of immature bolls were made by Mr. Watson and the writer, showing 75 to 100 per cent more bolls on the single-stalk rows than on the others, it is believed that the difference in yield from the second picking, had it been recorded, would have been even greater than 39 per cent. But even if it were no greater, or considerably less, the difference in the first picking is of marked significance, since the experiment was located in a section of maximum boll-weevil infestation, where earliness in the cotton crop is of the greatest importance.

The Boney experiment.—This experiment was on sandy soil located on the farm of Mr. R. K. Boney, at Duckport. Half-and-Half cotton was planted under fairly desirable conditions (date and rate not reported) and a good stand was secured. Definite details concerning the time of thinning the old-method rows and their condition when thinned were not reported. The plants in these rows were spaced,

[1] See Cook, O. F. Leaf-cut, or tomosis, a disorder of cotton seedlings. *In* U. S. Dept. Agr., Bur. Plant Indus. Cir. 120, p. 29-34, 1 fig. 1913.

however, 18 to 24 inches in the row. When inspected on June 3, the old-method plants were branching normally, indicating fairly early thinning. At this time, also, the plants in the single-stalk rows were rather too far advanced for the best results, numerous fruiting branches being visible. Although thinning was completed within the two days following, on June 4 and 5, it is reasonable to assume that more significant results would have been obtained had thinning been done several days earlier. When thinned the plants were 8 to 12 inches high with 6 to 8 leaves. With a long-staple variety, this would have been more nearly the proper time to thin, but with Half-and-Half, a short-staple cotton, it unquestionably was too late. The plants were spaced about 8 inches apart.

There were 12 rows in the experiment, and the two systems of culture were compared in alternate rows. Two pickings were made, the yields of each row for each picking being as reported in Table V.

TABLE V.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 on the farm of R. K. Boney, Duckport, La.*

Row.	Yield of seed cotton (pounds).					
	First picking.		Second picking.		Total.	
	Single stalk.	Old method.	Single stalk.	Old method.	Single stalk.	Old method.
No. 1	38	34	16	24	54	58
No. 2	34	35	31	24	65	59
No. 3	38	34	29	22	67	56
No. 4	40	30	27	21	67	51
No. 5	35	35	24	21	59	56
No. 6	42	38	22	28	64	66
Total	227	206	149	140	376	346
Difference	21	.....	9	.....	30	.....
Increase .....per cent..	10	.....	6	.....	9	.....

Table V shows that the yield per row at each picking favored single-stalk culture in all but 4 instances, in one of which the yields were identical. In total yield, single-stalk culture led in four of the six rows. The total yield at each picking favored single-stalk culture by 10 and 6 per cent, respectively, the total increase for both pickings being 9 per cent. This difference is considerably less than was forecast by boll counts made on August 14, when it was found that single-stalk rows had from 40 to 50 per cent more bolls than old-method rows. The chief reason for this discrepancy between the boll counts and the yields reported may lie in the probability that more bolls opened earlier on the single-stalk rows than on the old-method rows and more of the cotton on the former was lost before picking time. This explanation appears the more credible if we take into account the fact that varieties of the type used in this experiment are lacking in stormproof qualities.

The Webb experiment.—Mr. R. C. Webb, of Delta Point, planted Money Maker cotton on sandy soil on April 20 at the rate of three pecks per acre. The stand secured was poor generally, there being also a number of skips in each row. Owing to nonuniformity in germination, there were, moreover, plants of various sizes in the single-stalk rows at thinning time. The smaller plants were still too young to have had their vegetative branches completely suppressed, while the larger plants had reached the stage where their fruiting branches were being suppressed. Since it was necessary to leave plants of all sizes in the row in order to have the spacing as uniform as possible, some allowances should be made in considering the results of the experiment.

There were 30 rows in the experiment and the two systems of culture were compared in alternate rows. The old-method rows were thinned on May 20, when the plants were 4 to 5 inches high and had 3 to 4 leaves. The single-stalk rows were thinned on June 6, when the plants were 6 to 12 inches high and had 6 to 10 leaves. The plants in the old-method rows were spaced 18 to 24 inches apart, while the single-stalk plants were spaced at about 8 inches wherever the stand permitted such close spacing.

Two pickings were made, the yields from each row for each picking being as shown in Table VI.

TABLE VI.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 on the farm of R. C. Webb, Delta Point, La.*

Row.	Yield of seed cotton (pounds).					
	First picking.		Second picking.		Total.	
	Single stalk.	Old method.	Single stalk.	Old method.	Single stalk.	Old method.
No. 1	13	13	32	24	45	37
No. 2	9	18	25	18	34	36
No. 3	18	19	23	22	41	41
No. 4	9	13	23	21	32	34
No. 5	13	14	32	20	45	34
No. 6	11	18	20	18	31	36
No. 7	14	18	16	16	30	34
No. 8	8	14	14	15	22	29
No. 9	13	13	16	20	29	33
No. 10	13	18	16	15	29	33
No. 11	14	14	17	14	31	28
No. 12	14	13	15	12	29	25
No. 13	8	18	16	18	24	36
No. 14	18	13	15	15	33	28
No. 15	18	13	15	14	33	27
Total	193	229	295	262	488	491
Difference		36	33			3
Increase.....per cent		19	15			0.6

Table VI shows a difference of 19 per cent in favor of the old system of culture at the first picking. The lower yield of the single-stalk rows at this picking doubtless resulted, as already explained, from the fact that the thinning was done too late in the case of some

plants and too early in the case of others in the same row. However, as often happens in such cases, the difference was practically offset by the yields of the second picking, which favored single-stalk culture by 15 per cent. There was practically no real difference in total yield, though the old system had a very slight advantage. This was contrary to what was to be expected, in spite of the poor stand, as counts of immature bolls made on August 14 indicated an increase for single-stalk culture of 15 to 20 per cent.

BOSSIER PARISH.

Two experiments were conducted in Bossier Parish, both in the immediate vicinity of Benton. One of these was on the farm of Mr. E. S. Burt, parish agent, and was conducted by Essie Jackson, a tenant; the other was on the farm of Mr. W. B. Wilbourn.

The Jackson experiment.—Cotton of the Brown variety was planted April 7 on low beds 4 feet apart. The soil, a sandy loam, was in good condition and a full stand was obtained. Wet weather prevailed during April, followed by dry weather during May, this being unfavorable to good growth.

The old-method rows were thinned on May 17, the plants, which were 3 to 4 inches high with 4 to 5 leaves, being spaced 18 to 24 inches apart. The single-stalk rows were not thinned until June 9, when the plants, being 10 to 14 inches high with 6 to 10 leaves, were spaced about 8 inches apart.

There were 26 rows in the experiment, and the two systems of culture were compared in alternate rows. Two pickings were made. The yields of each row for each picking and the total yields are reported in Table VII.

TABLE VII.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 by Essie Jackson on the farm of E. S. Burt, Benton, La.*

Row.	Yield of seed cotton (pounds).					
	First picking.		Second picking.		Total.	
	Single stalk.	Old method.	Single stalk.	Old method.	Single stalk.	Old method.
No. 1	26	30	15	10	41	40
No. 2	30	28	15	10	45	38
No. 3	26	28	15	15	41	43
No. 4	26	26	15	20	41	46
No. 5	25	25	20	15	45	40
No. 6	28	28	15	15	43	43
No. 7	28	28	15	10	43	38
No. 8	23	24	15	15	38	39
No. 9	28	28	20	10	48	38
No. 10	23	23	15	10	38	33
No. 11	28	28	15	10	43	38
No. 12	23	18	10	10	33	28
No. 13	22	24	10	10	32	34
Total	336	338	195	160	531	498
Difference	.....	2	35	.....	33	.....
Increase .....per cent.	.....	0.6	22	.....	7	.....

Table VII shows a slight increase in the total yield from the first picking in favor of the old method, though in only 4 of the 13 instances did old-method rows yield more than single-stalk rows. In 7 instances the yields were identical. It is believed that the reason for this difference in yield at the first picking may be found in the fact that the single-stalk rows were thinned much later than was advisable, some suppression of the lower fruiting branches already having taken place. By the time the second picking was made this handicap had been overcome and the single-stalk rows yielded 22 per cent more cotton than the others, making a total increase in yield of 7 per cent.

An interesting point in regard to the value of single-stalk culture under conditions conducive to unusually rank growth was observed in connection with this experiment. A hogpen once stood near one end of several of these rows and the soil here was much richer than elsewhere in this field. The cotton plants grew to heights of 5 to 7 feet and put on a dense foliage. The plants in the early-thinned wide-spaced rows threw out long vegetative branches, and when nearing maturity these settled to the ground, in many cases breaking away from the main stalk and in all cases obstructing the space between the rows. It was difficult also to pick cotton from these plants, and owing to its being allowed to touch the ground much of the cotton was spoiled. The single-stalk plants, on the other hand, stood erect, their fruit well off the ground and easily accessible. Moreover, the space between these rows was left open enough to allow cultivation.

The Wilbourn experiment.—Cotton of the Brown variety was planted on April 7 in low beds in rows about 4 feet apart, and a fairly good stand was secured. Wet weather prevailed during the remainder of April, followed by drought during May, which was not favorable to good growth.

The thinning of the old-method rows was done on May 17, when the plants were 3 to 4 inches high, with 2 to 4 leaves, while the single-stalk rows were not thinned until June 9, when the plants were about 8 inches high and had 6 to 8 leaves. The plants in the old-method rows were spaced 18 inches apart and those in the single-stalk rows 6 to 8 inches.

There were 40 rows in the experiment and the two systems of culture were compared in alternate rows. Only one picking was made. The yields obtained from each row are reported in Table VIII.

Table VIII shows that in no instance did single-stalk culture yield more than the old method with which it was compared, the total increase for the old method being 17 per cent. This is absolutely the reverse of what was indicated on August 16 by boll counts

made by Mr. E. S. Burt, agent for Bossier Parish; Mr. A. J. Scott, agent for Caddo Parish; and the writer. Then there were 40 to 50 per cent more bolls on the single-stalk rows and it was confidently expected by all present that the yields would vary in about the same proportion, favoring single-stalk culture. It is believed that much of the cotton on the single-stalk rows had fallen from the bolls before picking time, for the crop was not picked until October 26, which was unusually late.

TABLE VIII.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 on the farm of W. B. Wilbourn, Benton, La.*

Row.	Yield of seed cotton (pounds).		Row.	Yield of seed cotton (pounds).	
	Single stalk.	Old method.		Single stalk.	Old method.
No. 1	35	45	No. 13	35	35
No. 2	35	45	No. 14	35	40
No. 3	50	45	No. 15	30	40
No. 4	35	40	No. 16	35	35
No. 5	35	45	No. 17	30	40
No. 6	40	45	No. 18	25	30
No. 7	30	45	No. 19	30	40
No. 8	30	35	No. 20	25	25
No. 9	30	40			
No. 10	30	35	Total	645	780
No. 11	35	40	Difference		135
No. 12	35	35	Increase.....per cent		17

CADDO PARISH.

Two experiments were conducted in Caddo Parish, one on the farm of Mr. C. C. Herndon, near Shreveport, and the other on the farm of Mr. William Mercer, at Gilliam, about 20 miles northwest from Shreveport.

While early seasonal conditions in this part of the State were more favorable to the normal growth of the crop than in most other sections, they were not ideal, in that some drought obtained during April and May.

The Herndon experiment.—This experiment was the only one of the series in which single-stalk culture was compared with the usual method on an acre basis. The single-stalk acre was located in a rather low corner of a field of several acres, and it maintained only a fair stand. Moreover, there were several skips in each row. The field was planted rather late in April, and dry weather prevented uniform germination.

There was a difference of only nine days in the time of thinning the two plats in this experiment. The old-method rows were thinned on June 4, when the plants were 3 to 4 inches high and had 2 to 4 leaves, while the single-stalk rows were thinned on June 13, when the plants were 6 to 8 inches high and had 5 to 8 leaves. The plants in the former rows were spaced 18 to 24 inches apart and those in the latter 6 to 8 inches.

The yields reported in Table IX are for the first picking from 10 representative rows in the single-stalk acre and 10 in an adjoining acre. No complete report on the second picking is available.

TABLE IX.—*Row yields of first picking obtained in a single-stalk culture experiment with cotton conducted in 1915 on the farm of C. C. Herndon, Shreveport, La.*

Row.	Yield of seed cotton (pounds).		Row.	Yield of seed cotton (pounds).	
	Single stalk.	Old method.		Single stalk.	Old method.
No. 1	13	11	No. 8	13	11
No. 2	11	10	No. 9	14	12
No. 3	12	12	No. 10	13	14
No. 4	10	11			
No. 5	12	12	Total	123	112
No. 6	12	10	Difference	11	.....
No. 7	13	9	Increase.....per cent..	9.8	.....

Table IX shows that in 6 out of 10 instances greater yields were obtained from single-stalk rows. In two instances the yields were identical, while in two other instances the old-method yield exceeded the single-stalk yield by 1 pound per row. The total yield of the 10 rows favored single-stalk culture by 9.8 per cent.

The Mercer experiment.—While Mr. William Mercer, of Gilliam, cooperated in this work on the same basis as other farmers, he was left much alone in the conduct of his experiment. It was impracticable to visit his field at thinning time, and consequently he thinned his cotton according to his interpretation of the general instructions offered. At all times, however, he cooperated with Mr. A. J. Scott, county agent. No report of how he planted his cotton or the time and method of thinning is available. The only data available are given in Table X.

TABLE X.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 on the farm of William Mercer, Gilliam, La.*

Row.	Yield of seed cotton (pounds).					
	First picking.		Second picking.		Total.	
	Single stalk.	Old method.	Single stalk.	Old method.	Single stalk.	Old method.
No. 1	12	9	2	22	14	31
No. 2	10	10	22	22	32	32
No. 3	9	10	12	2	21	12
No. 4	9	10	12	22	21	32
No. 5	10	10	2	22	12	32
No. 6	10	9	22	2	32	11
No. 7	10	10	22	2	32	12
No. 8	10	9	2	2	12	11
No. 9	9	10	2	22	11	32
No. 10	10	9	2	2	12	11
Total	99	96	100	120	199	216
Difference	3	.....	.....	20	.....	17
Increase.....per cent..	3	.....	.....	20	.....	8

Table X shows a wide variation in yields from the two systems of culture. In the yields from the first picking, single-stalk culture led in 4 of the 10 instances. In 3 instances the yields were identical and in 3 other instances greater yields were obtained from the old-method rows. The total yield from the first picking was slightly (3 per cent) in favor of single-stalk culture.

In the yields from the second picking, single-stalk culture led in only 3 of the 10 instances, while the old method led in 4. In 3 instances the yields were identical. It is remarkable that the yields throughout differed in about the same proportion. The total yield of the second picking, however, favored the old method of culture by 20 per cent, making an increase of 8 per cent in total yield for this method.

Arkansas.

Owing to the damage done by early spring floods, most of the experiments begun in Arkansas were abandoned. The only ones which promised any dependable results were located in Miller County, in the vicinity of Texarkana, and at Warren, in Bradley County. The latter experiment, however, was located in a pecan grove and the trees apparently so reduced the supply of moisture in the soil that when the drought of August was encountered the cotton plants were compelled to shed a large proportion of their squares. This damage, combined with apparent weevil damage, made the test practically without value.

Miller County.

The experiments in Miller County were conducted by Messrs. D. R. Akin, J. E. Tanner, and W. B. Latta, the first named being located about 10 miles south of Texarkana, at Fouke, and the others being located in the immediate vicinity of Texarkana. Mr. R. M. Meade, of the Bureau of Plant Industry, visited these experimenters early in June and directed the thinning of the single-stalk rows.

The Akin experiment.—Mr. D. R. Akin, of Fouke, planted Lone Star cotton on May 20, about 15 days later than usual. Unfortunately, only a small amount (12 pounds per acre) of seed was planted, and a relatively poor stand resulted. Wet weather occurred immediately after planting, and this was followed by drought, which caused the surface soil to bake. At the time of thinning the single-stalk rows it was observed that the plants were not standing thick enough to insure complete suppression of the vegetative branches, but enough had been suppressed to make the test worth carrying out.

There were 28 rows in the experiment, 8 in which the two systems of culture were compared in alternate rows and 20 in which comparisons were made in alternate blocks of 5 rows each. The plants in the old-method rows were spaced about 18 inches apart and those in the single-stalk rows about 8 inches, wherever the stand per-

mitted. The exact dates of thinning were not reported, but it is known that the single-stalk rows were thinned later than the others.

In reporting the yields obtained, Mr. Akin stated:

> The experiment has not been at all satisfactory to me, owing to several causes: (1) I did not plant enough seed to crowd the cotton sufficiently at the start; (2) the cotton being late, the continuous rains in August caused an enormous amount of blooms to sour and fall off; (3) the boll weevil and bollworms finished what the rain left. However, I thought you might be able to get some data from the report. You will see I had only one picking, no middle or top crop at all.

Mr. Akin stated further that rows 21 to 28, inclusive, were on much richer soil than the others, and he felt that for this reason they were not comparable. The yields from the remaining 18 rows are reported in Table XI. The first four rows were in the alternate-row test; the remaining five were in a 5-row block of adjoining rows.

TABLE XI.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 by D. R. Akin, Fouke, Ark.*

Row.	Yield of seed cotton (pounds).		Row.	Yield of seed cotton (pounds).	
	Single stalk.	Old method.		Single stalk.	Old method.
Alternate rows:			5-row block—Continued.		
No. 1	13	9	No. 7	15	10
No. 2	13	10	No. 8	11	11
No. 3	13	9	No. 9	11	10
No. 4	14	10			
5-row block:			Total	115	90
No. 5	14	9	Difference	25	.....
No. 6	11	12	Increase .....per cent..	28	.....

Table XI shows that in every instance the alternate-row yields favored single-stalk culture, and in every instance but one the block-test yields favored this system. The total increase for single-stalk culture was 28 per cent.

The Tanner experiment.—Mr. J. E. Tanner, R. F. D. No. 7, Texarkana, planted 60 pounds of Triumph seed per acre on April 18, which was unusually early. The high rate of planting resulted in a good stand, but unsettled weather, accompanied by sudden changes of temperature, caused a very noticeable amount of leaf-cut.[1]

Although somewhat later than desirable, it was possible to thin the single-stalk rows in a fairly satisfactory manner; but the yields from these could not be expected to vary much from those of the old-method rows, because the latter were thinned unusually late, accomplishing some suppression of vegetative branches, and the plants were left about as near together as those in the single-stalk rows.

[1] See Cook, O. F. Leaf-cut, or tomosis, a disorder of cotton seedlings. *In* U. S. Dept. Agr., Bur. Plant Indus. Cir. 120, p. 29–34, 1 fig. 1913.

The early thinning was done on May 10 and the later thinning on June 5. When thinned, the plants in the old-method rows were 4 to 6 inches high and had 4 to 6 leaves, while those in the single-stalk rows were 8 to 10 inches high and had 6 to 8 leaves. The old-method plants were spaced 8 to 12 inches apart and the single-stalk plants 6 to 8 inches apart.

There were 20 rows in the experiment, 10 in which the systems of culture were compared in alternate rows, and 10 in which comparison was made in 5-row blocks of adjoining rows. The yields from each of the two pickings made are reported in Table XII.

TABLE XII.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 by J. E. Tanner, Texarkana, Ark.*

Row.	Yield of seed cotton (pounds).					
	First picking.		Second picking.		Total.	
	Single stalk.	Old method.	Single stalk.	Old method.	Single stalk.	Old method.
Alternate rows:						
No. 1	8	8	3	4	11	12
No. 2	8	6	4	5	12	11
No. 3	7	8	4	3	11	11
No. 4	7	8	3	3	10	11
No. 5	7	8	4	2	11	10
5-row blocks:						
No. 6	8	9	4	3	12	12
No. 7	8	9	4	2	12	11
No. 8	9	9	5	3	14	12
No. 9	8	9	3	3	11	12
No. 10	9	8	5	3	14	11
Total	79	82	39	31	118	113
Difference	.....	3	8	.....	5	.....
Increase.....per cent	.....	4	26	.....	4	.....

Table XII shows an increase of 4 per cent in the total yield from the first picking for the old method, doubtless because of the lateness of thinning of the single-stalk rows. But as often happens in such cases there was a greater difference, 26 per cent, in favor of single-stalk culture for the second picking, making the total yield 4 per cent greater for this system.

The Latta experiment.—Mr. W. B. Latta, of Texarkana, used Mebane cotton in two experiments on his farm. One of these was planted on April 25 and the other on May 10. He used about 30 pounds of seed per acre and a good stand was secured on both fields. The thinning of the old-method rows was done at the usual time, May 10 and May 25, respectively, the plants being spaced 12 to 15 inches apart. The single-stalk rows were thinned when the plants were 10 inches high and had 7 or 8 leaves. They were spaced about 6 inches apart.

When inspected late in August, these experiments promised to be very favorable to single-stalk culture, as about 25 per cent more bolls

were found on these rows than on the old-method rows. Unfortunately, however, Mr. Latta failed to report the yields in detail, merely stating that, in the total yield of two pickings, single-stalk culture exceeded the old-system by an average of 1½ pounds per row, or 11 per cent.

North Carolina.

Nine experiments were conducted in North Carolina. These were divided among four counties, namely, Edgecombe, Duplin, Sampson, and Craven. While it was possible in all cases to plant cotton at about the usual time, the weather immediately following was unfavorable to normal growth, being wet and cold. Consequently some poor stands were obtained, and in certain instances considerable difficulty was encountered in getting the single-stalk rows thinned in proper time.

EDGECOMBE COUNTY.

There were three experiments in Edgecombe County, one each at Whitakers, Battleboro, and Conetoe, all being located on soil classed as Norfolk sandy loam. The cotton was grown in rows 3 to 4 feet apart, planted flat; that is, not in beds. A rather heavy rate of seeding was used in all cases and good stands were secured. It was impossible for the writer or any of his associates to inspect these experiments in time to direct the thinning of the single-stalk rows, so Mr. Zeno Moore, county agent, directed it on the basis of his understanding of the new system.

The Benson experiment.—Mr. W. K. Benson, of Battleboro, planted Ricks, a short-limbed variety of cotton, on April 22, using one bushel of seed per acre, and a good stand was obtained. The old-method rows were thinned on May 22, the plants being 2 to 3 inches high and having 2 to 4 leaves. The single-stalk rows were thinned on June 24, when the plants were 8 to 10 inches high and had 10 to 12 leaves. The plants in the old-method rows were spaced about 14 inches apart, while those in the single-stalk rows were spaced 6 to 8 inches apart.

In submitting the above data, Mr. Moore reported that the rows were not thinned with "perfect regularity." When visited by the writer in August, it appeared that the plants in the single-stalk rows were left too thick, there being, in the majority of cases, 2 to 3 plants in a hill. The suppression of vegetative branches had been accomplished and probably to some extent that of the fruiting branches as well. This may account for the greater yield obtained on the old-system rows at the first picking, as shown in Table XIII.

Table XIII shows that a greater yield, of 22 per cent, was obtained from the old-system rows at the first picking, but a greater yield, of 353 per cent, was obtained from the single-stalk rows at the second picking, making the total yield favor single-stalk culture by 20 per

cent. The greater yield of the old-method rows at the first picking is in itself an evidence of the fact that the thinning of the single-stalk rows was too late to give the best results, but, as not infrequently happens, the loss was more than made good by the increased yield of the single-stalk rows at the second picking.

TABLE XIII.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 by W. K. Benson, Battleboro, N. C.*

Row.	Yield of seed cotton (pounds).					
	First picking.		Second picking.		Total.	
	Single stalk.	Old method.	Single stalk.	Old method.	Single stalk.	Old method.
No. 1	51	49	35	24	86	73
No. 2	51	65	34	14	85	79
No. 3	58	62	38	9	96	71
No. 4	53	71	43	8	96	79
No. 5	53	63	40	11	93	74
No 6	58	72	37	7	95	79
No. 7	64	80	35	5	99	85
No. 8	60	72	32	.....	92	72
No. 9	59	78	32	.....	91	78
No. 10	57	74	27	.....	84	74
Total	564	686	353	78	917	764
Difference	.....	122	275	.....	153	.....
Increase.....per cent	.....	22	353	.....	20	.....

The Draughon experiment.—Mr. L. L. Draughon, of Whitakers, used Cleveland Big Boll cotton in his experiment, there being 28 rows in all. The two systems of culture were compared in alternate rows. Thinning was completed in a fairly satisfactory manner, though a little later than was advisable for single-stalk culture.

Mr. Draughon reports that it was impossible to get pickers in time for the first picking and consequently the cotton remained unpicked until late in November. Undoubtedly much cotton was lost meantime, particularly from the single-stalk rows. Only total yields were reported, and these were 1,074 pounds for single-stalk culture and 1,004 for the old method, a difference of 70 pounds, or 7 per cent, in favor of single-stalk culture.

The Felton experiment.—Mr. W. R. Felton, of Conetoe, chopped the single-stalk rows of his experiment in such a manner as to leave the plants standing in bunches, which, however, probably suppressed the development of vegetative branches in much the same manner as single-stalk culture. He reported the yields which are given in Table XIV. Only one picking was made, on November 2, probably after some cotton had fallen from the bolls.

Table XIV shows that in all but 4 of the 14 instances, single-stalk rows yielded more cotton than old-system rows, giving an 8 per cent increase for the new method. In reporting the above yields Mr. Felton stated: "I am satisfied that the thick rows would have made a better showing had they been properly thinned."

TABLE XIV.—*Row yields of the first picking obtained in a single-stalk culture experiment with cotton conducted in 1915 by W. R. Felton, Conetoe, N. C.*

Row.	Yield of seed cotton (pounds).		Row.	Yield of seed cotton (pounds).	
	Single stalk.	Old method.		Single stalk.	Old method.
No. 1	52	30	No. 10	42	38
No. 2	40	36	No. 11	44	42
No. 3	40	46	No. 12	42	38
No. 4	44	44	No. 13	38	32
No. 5	44	40	No. 14	40	46
No. 6	42	36			
No. 7	38	40	Total	582	540
No. 8	38	36	Difference	42	.....
No. 9	38	36	Increase.....per cent..	8	.....

SAMPSON COUNTY.

Three experiments were conducted in Sampson County, all in the immediate vicinity of Ingold, on sandy-loam soil. The writer directed the thinning of the single-stalk rows in the latter part of June, when it was found that had thinning been done a week or 10 days earlier it would have been far more favorable. Still, fairly satisfactory comparisons of the new with the old system of culture were possible.

The Sloan experiment.—Mr. H. D. Sloan planted Prolific cotton, of the King type, on April 20, and a good stand was secured in spite of unfavorable weather. The old-method rows were thinned on May 25 and the single-stalk rows not until June 28. The plants in the former rows were 3 to 4 inches high with 3 to 5 leaves, and they were spaced 18 inches apart. In the latter rows the plants were 8 to 10 inches high with 6 to 10 leaves, and they were spaced 6 to 8 inches apart.

There were 30 rows in the experiment, 20 in which the systems of culture were compared in alternate rows and 10 in which comparison was made in adjoining blocks of 5 rows each. Only one picking was made. The yields reported by Mr. Sloan are given in Table XV.

TABLE XV.—*Row yields of the first picking obtained in a single-stalk culture experiment with cotton conducted in 1915 by H. D. Sloan, Ingold, N. C.*

Row.	Yield of seed cotton (pounds).		Row.	Yield of seed cotton (pounds).	
	Single stalk.	Old method.		Single stalk.	Old method.
Alternate rows:			Adjoining blocks:		
No. 1	46	41	No. 11	48	37
No. 2	44	38	No. 12	49	41
No. 3	44	36	No. 13	48	39
No. 4	45	42	No. 14	46	37
No. 5	47	38	No. 15	47	38
No. 6	46	36			
No. 7	48	39	Total	699	582
No. 8	47	42	Difference	117	.....
No. 9	48	38	Increase.....per cent..	20	.....
No. 10	46	40			

Table XV shows that in each of the 15 instances single-stalk culture gave a greater yield than the old system, the total increase being 117 pounds, or 20 per cent.

The Wright experiment.—Mr. W. I. Wright planted one-half bushel of Simpkins cotton per acre on April 20. Owing to unfavorable weather, only a poor stand was obtained, and later the stand was further reduced by aphids, causing much leaf-curl. There were several short reaches in each row, however, where it was possible to apply single-stalk culture. It was believed that these places would affect the total yield of the rows to a degree which would indicate what might have been expected had it been possible to apply the method the full length of the rows.

The old-method rows were thinned on May 25, when the plants were 3 to 5 inches high and had 3 to 5 leaves. It was possible to space the plants in these rows about 18 inches apart with fair regularity. In the single-stalk rows, which were thinned on June 25, when the plants were about 10 inches high and had 6 to 8 leaves, the plants were spaced about 8 inches apart wherever the stand permitted.

There were 16 rows in the experiment, each 408 yards long. In 10 of these, comparisons were made in alternate rows; in the 6 remaining rows the comparison was made in adjoining blocks of 3 rows each. Two pickings were made. The yields obtained, as reported by Mr. Wright, are given in Table XVI.

TABLE XVI.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 by W. I. Wright, Ingold, N. C.*

Row.	Yield of seed cotton (pounds).					
	First picking.		Second picking.		Total.	
	Single stalk.	Old method.	Single stalk.	Old method.	Single stalk.	Old method.
Alternate rows:						
No. 1	211	194	39	37	250	231
No. 2	177	158	43	44	220	202
No. 3	177	153	45	51	222	204
No. 4	154	146	48	50	202	196
No. 5	179	137	43	32	222	169
Adjoining blocks:						
No. 6	209	187	34	37	243	224
No. 7	193	184	37	41	230	225
No. 8	197	188	35	33	232	221
Total	1,497	1,347	324	325	1,821	1,672
Difference	150	.....	.....	1	149	.....
Increase.....per cent..	11	.....	.....	0.3	9	.....

Table XVI shows that in each of the eight instances single-stalk culture yielded more cotton at the first picking, the total difference being 150 pounds, or 11 per cent. At the second picking the old method had a very slight, quite negligible, advantage. In total yield the single-stalk rows had an advantage of 9 per cent. The

increase in yield probably would have been greater had the stanp been such as to allow the application of single-stalk culture throughout the entire length of the rows.

The Green experiment.—Mr. L. F. Green obtained a very poor stand in his field of Cleveland Big Boll cotton and it was possible to apply single-stalk culture to only a few places in each of the rows reserved for this method. Owing to the fact that the land had been heavily fertilized the plants grew very rank, and when the parts of the rows to which single-stalk culture was applied were thinned the plants had attained a point in their development a little beyond that at which they might have been thinned to the best advantage. The data pertaining to the time of thinning, the condition of the plants at thinning time, and the spacing are the same as those reported for Mr. Wright's experiment except that the plants were a little taller and had 2 or 3 more leaves.

The yields from the only picking made, as reported by Mr. Green, are given in Table XVII.

TABLE XVII.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 by L. F. Green, Ingold, N. C.*

Row.	Yield of seed cotton (pounds).		Row.	Yield of seed cotton (pounds).	
	Single stalk.	Old method.		Single stalk.	Old method.
No. 1	80	71	No. 9	75	65
No. 2	80	80	No. 10	75	65
No. 3	75	68	No. 11	77	60
No. 4	76	78			
No. 5	82	75	Total	850	782
No. 6	83	80	Difference	68	
No. 7	70	75	Increase.....per cent..	9	
No. 8	77.	65			

Table XVII shows a total increase for single-stalk culture of 9 per cent, which probably would have been greater had the stand been such as to permit the application of single-stalk culture to the entire length instead of to only a few parts of each row.

DUPLIN COUNTY.

The Sanderson experiment.—The experiment conducted by Mr. L. M. Sanderson, at Warsaw, was the only one in Duplin County. He planted Cleveland Big Boll cotton on April 25 at the rate of 3 pecks per acre, and a fair stand was obtained in spite of unfavorable weather. Mr. G. S. Meloy, of the Bureau of Plant Industry, directed the thinning of the single-stalk rows and reported that it was completed in good time. The old-method rows were thinned on June 6, when the plants were 3 to 4 inches high and had 3 to 4 leaves. The single-stalk rows were thinned on June 17, when the plants were 8

to 10 inches high and had 6 to 7 leaves. The plants in the former rows were spaced 15 to 18 inches apart, those in the latter 4 to 6 inches.

There were 20 rows in the experiment, and the two systems of culture were compared in pairs of rows—that is, two single-stalk rows alternated with two old-system rows, making 5 pairs of rows for each system. Only one picking was made, and this was delayed until late in November, at which time, it was reported, all the bolls were open. Whether much cotton had fallen to the ground meantime can not be stated; but it is safe to assume that some had fallen, especially from single-stalk rows, which probably were earlier than the others. The row yields, as reported by Mr. Sanderson, are given in Table XVIII.

TABLE XVIII.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 by L. M. Sanderson, Warsaw, N. C.*

Row.	Yield of seed cotton (pounds).		Row.	Yield of seed cotton (pounds).	
	Single stalk.	Old method.		Single stalk.	Old method.
No. 1	91	84	No. 8	95	74
No. 2	69	76	No. 9	89	85
No. 3	87	58	No. 10	51	72
No. 4	74	72			
No. 5	68	83	Total	765	722
No. 6	68	52	Difference	43	.....
No. 7	73	66	Increase.....per cent	6	.....

Table XVIII shows that in 7 of the 10 instances single-stalk culture yielded more than the old method, the differences varying from 2 to 21 pounds per row. In the remaining three instances the old method gave greater yields, varying from 7 to 21 pounds per row. The total yield favored single-stalk culture by 43 pounds, or 6 per cent.

CRAVEN COUNTY.

Two experiments were conducted in Craven County—one by J. L. Roper, at Riverdale, and another by B. C. Peterson, at Vanceboro.

The Roper experiment.—Mr. W. M. Laughinghouse, superintendent of the Rockwell Farm of J. L. Roper, at Riverdale, planted cotton on May 11 in rows 4 feet apart on flat land, using 1 bushel of seed per acre. A good stand was secured, but dry and cold weather during May and early June checked growth materially. No definite information concerning the dates of thinning and the condition of the plants when thinned is available, but the plants in the old-method rows were spaced at 20 inches in the row as compared with 2 to 6 in the single-stalk rows. The thinning was done by Mr. Laughinghouse as suggested by Mr. J. W. Sears, county agent. It was not practi-

cable for the writer or any of his associates to inspect this experiment at any time during the season.

There were 18 rows in the experiment, and the two systems of culture were compared in alternate rows. Three pickings were made, and the row yields for each picking as reported by Mr. Laughinghouse are given in Table XIX.

TABLE XIX.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 by Supt. W. M. Laughinghouse on the Rockwell Farm of J. L. Roper at Riverdale, N. C.*

Row.	Yield of seed cotton (pounds).							
	First picking.		Second picking.		Third picking.		Total.	
	Single stalk.	Old method.	Single stalk.	Old method.	Single stalk.	Old method.	Single stalk.	Old method.
No. 1	63	48	58	55	5	7	126	110
No. 2	66	45	53	41	4	3	123	89
No. 3	71	51	42	33	6	3	119	87
No. 4	82	71	43	24	6	2	131	97
No. 5	73	68	47	25	7	3	127	96
No. 6	74	60	43	32	6	5	123	97
No. 7	81	59	18	27	6	2	105	88
No. 8	59	58	31	21	4	6	94	85
No. 9	51	50	27	16	3	2	81	68
Total	620	510	362	274	47	33	1,029	817
Difference	110	.....	88	.....	14	.....	212	.....
Increase.....per cent..	22	.....	32	.....	42	.....	26	.....

Table XIX shows that single-stalk culture yielded more than the old method in every instance but three, namely, the second picking of row 7 and the third picking of rows 1 and 8. Single-stalk culture yielded 110 pounds, or 22 per cent, more at the first picking; 88 pounds, or 32 per cent, more at the second picking; and 14 pounds, or 42 per cent, more at the third picking, making a difference in total yield of 212 pounds, or 26 per cent.

The Peterson experiment.—Mr. B. C. Peterson, of Vanceboro, planted King cotton on April 23. The soil used was sandy loam and the cotton was planted on low beds in rows 4 feet apart, about one-half bushel of seed per acre being the rate used. The seed germinated fairly well, but wet and cold weather following injured the stand, leaving several skips in each row. While these skips were not serious in the old-method rows, in the single-stalk rows they prevented a satisfactory test of this system. The fact that it was possible to apply single-stalk culture to parts of the rows, however, makes it possible to gain from the yields reported an idea of what might have been expected had it been possible to apply the system to the entire length of the rows.

There were 20 rows in the experiment, and the two systems of culture were compared in alternate rows. The old-method rows were thinned on May 23, when the plants, which were 4 to 6 inches

high and had 4 to 6 leaves, were spaced 16 inches apart. The single-stalk rows were thinned on June 24, when the plants, 8 to 10 inches high with 10 to 12 leaves, were spaced 6 to 8 inches apart.

Only one picking was made. The yield of each row as reported by Mr. Peterson is given in Table XX.

TABLE XX.—*Row yields obtained in a single-stalk culture experiment with cotton conducted in 1915 by B. C. Peterson, Vanceboro, N. C.*

Row.	Yield of seed cotton (pounds).		Row.	Yield of seed cotton (pounds).	
	Single stalk.	Old method.		Single stalk.	Old method.
No. 1	57	66	No. 8	69	68
No. 2	62	57	No. 9	76	70
No. 3	60	56	No. 10	70	63
No. 4	56	61			
No. 5	69	62	Total	649	631
No. 6	66	69	Difference	18	.....
No. 7	64	59	Increase ....per cent..	3	.....

Table XX shows that in 7 of the 10 instances single-stalk rows yielded more than the old-method rows. The difference in total yield, however, due largely to a poor stand, was only 18 pounds, or 3 per cent, in favor of single-stalk culture.

TABULAR SUMMARY.

The yields of seed cotton obtained from the 21 experiments discussed in the preceding pages are summarized in Table XXI.

TABLE XXI.—*Summary of yields obtained in 21 single-stalk culture experiments with cotton conducted in 1915 in 9 parishes and counties in Louisiana, Arkansas, and North Carolina.*

Picking and method.	Yield of seed cotton (pounds).																				
	Louisiana.									Arkansas.			North Carolina.								
	Hebert.	Robillard.	Killarney.	Boney.	Webb.	Jackson.	Wilbourn.	Herndon.	Mercer.	Akin.	Tanner.	Latta.[1]	Benson.	Draughon.	Felton.	Sloan.	Wright.	Green.	Sanderson.	Roper.	Peterson.
First picking:																					
Single stalk	505	226	287	227	193	336	645	123	99	115	79	...	564	1,074	582	699	1,497	850	765	620	649
Old method	380	177	207	206	229	338	780	112	96	90	82	...	686	1,004	540	582	1,347	782	722	510	631
Second picking:																					
Single stalk	350	211	...	149	295	195	.....	.....	100	...	39	...	353	.....	.....	.....	324	.....	.....	362	...
Old method	300	178	...	140	262	160	.....	.....	120	...	31	...	78	.....	.....	.....	325	.....	.....	274	...
Third picking:																					
Single stalk	...	169	...	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47	...
Old method	...	134	...	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	33	...
Total:																					
Single stalk	855	606	287	376	488	531	645	123	199	115	118	...	917	1,074	582	699	1,821	850	765	1,029	649
Old method	680	489	207	346	491	498	780	112	216	90	113	...	764	1,004	540	582	1,672	782	722	817	631
Increase (per cent):																					
Gain or loss (−) for single stalk	26	24	39	9	−0.6	7	−17	10	−8	28	4	11	20	7	8	20	9	9	6	26	3

[1] Actual yields not reported.

In six of the nine experiments conducted in Louisiana the total yield of seed cotton favored single-stalk culture by 9 to 39 per cent. In the other three experiments the total yield favored the old method by 0.6, 8, and 17 per cent, respectively. In the latter instance only one picking was made, and this so late that it is feared some cotton was lost, particularly from the single-stalk rows, which probably opened earlier than the others; also the reports of this experiment are so defective as to throw some doubt upon their record value. In the second instance the experiment was not inspected by the writer and only the yield records are available, so that it can not be stated with assurance that single-stalk culture was properly applied. In the first instance the stand was so poor that the new system could not be applied to good advantage, and it appears, moreover, that the first picking was made too late to secure the full yield. More than one picking was made from six of these experiments. In four of the six instances single-stalk culture yielded 3 to 32.9 per cent more seed cotton at the first picking. The yields from the other two experiments were influenced by thinning that was too late and by a poor stand, respectively. In five of six instances single-stalk culture yielded 6 to 22 per cent more at the second picking. A third picking was made in only one instance, and this favored single-stalk culture by 26.1 per cent.

There were three experiments in Arkansas, and in total yield these favored single-stalk culture by 4, 11, and 28 per cent, respectively. In one instance, where thinning was done a little too late, the old method yielded 4 per cent more seed cotton at the first picking, but this was offset by a 26 per cent increase for single-stalk culture at the second picking.

In all of the nine experiments in North Carolina, single-stalk culture gave greater total yields than the older methods, the differences varying from 3 to 26 per cent. In one instance, where the time of thinning was too late, the old method gave 22 per cent more seed cotton at the first picking, but this was offset by a 353 per cent increase for single-stalk culture at the second picking. In another instance, where three pickings were made, single-stalk culture yielded more seed cotton at each picking than the old method, the difference for each picking being 22, 32, and 42 per cent, respectively.

YIELD AND QUALITY OF LINT.

Having seen the effectiveness of single-stalk culture in increasing the yield of seed cotton over that of the usual systems of culture, it is of importance to know whether the lint was affected by the new system. It might be expected that the suppression of vegetative branches and the closer spacing of the resultant smaller plants would so affect the yield or quality of lint as largely to offset the advantage

gained through increased yield of seed cotton. This condition does not exist, however, as shown by the results of determinations made in connection with the present experiments and those previously reported.

LINT PERCENTAGES.

Table XXII gives the per cent of lint as determined in samples of seed cotton sent in by five farmers from their respective experiments. Reference to Table I, page 4, will show the locations of these farmers, which fairly represent the general distribution of the experiments. One is in south-central Louisiana, one in northeastern Louisiana, one in southwestern Arkansas near the Arkansas-Louisiana line, and two are in North Carolina. The varieties used in these experiments were, respectively, Half-and-Half, Sugar Loaf, Triumph, Prolific (probably King), and Cleveland Big Boll.

TABLE XXII.—*Percentage of lint in samples of seed cotton taken in five single-stalk culture experiments with cotton conducted in 1915 in Louisiana, Arkansas, and North Carolina.*

Sample.	R. K. Boney.	John Hebert.	J. E. Tanner.	H. D. Sloan.	L. M. Sanderson.
Old method:					
No. 1	35	35	36	37	36
No. 2	37	34	34	35	37
No. 3	35	33	33	36	37
No. 4	36	33	36	35	39
No. 5	38	34	33	35	37
Single stalk:					
No. 1	39	34	33	35	36
No. 2	37	33	34	35	37
No. 3	36	33	35	38	35
No. 4	37	33	32	39	37
No. 5	32	33	34	37	37
Average:					
Old method	36.2	33.8	34.4	35.6	37.2
Single stalk	36.2	33.2	33.6	36.8	36.4

Table XXII shows practically no difference in the average percentage of lint obtained under the different systems of culture. The difference is remarkably small in view of the great differences in percentage among the individual samples from some of the experiments. The greatest difference in average percentage of lint is 1.2, and this favors single-stalk culture. In three other instances the differences range from 0.6 to 0.8 per cent in favor of the old method. In the remaining instance the average percentages are identical.

RELATIVE ABUNDANCE OF LINT.

The percentage of lint in itself is no more a safe basis for comparing the effect of different cultural methods than it is for judging the relative value of varieties.[1] The percentage of lint would vary

[1] Cook, O. F. Danger in judging cotton varieties by lint percentages. U. S. Dept. Agr., Bur. Plant Indus. Cir. 11, 16 p. 1908.

Meloy, G. S. Lint percentages and lint index of cotton and methods of determination. U. S. Dept. of Agr. Bul. 644, 12 p., 2 fig. 1918.

materially with the size of the seed if the abundance of lint on the surface of the seed remained constant. Conversely, if the abundance of lint were not constant, the lint percentages might appear uniform even though the size of seed varied considerably. Thus it is desirable to know whether the size of seed and the amount of lint per seed were affected by single-stalk culture. The weight in grams of 100 seeds taken from each of the samples discussed in connection with Table XXII is shown in Table XXIII, together with the lint indexes, or the grams of lint on 100 seeds, of the same samples.

TABLE XXIII.—*Weights of 100 seeds and lint indexes (grams of lint on 100 seeds) of five different varieties of cotton as determined from samples of seed cotton grown in five single-stalk culture experiments with cotton conducted in Louisiana, Arkansas, and North Carolina.*

Sample.	Weight of 100 seeds (grams).					Lint indexes=weight of lint on 100 seeds (grams).				
	R. K. Boney.	John Hebert.	J. E. Tanner.	H. D. Sloan.	L. M. Sanderson.	R. K. Boney.	John Hebert.	J. E. Tanner.	H. D. Sloan.	L. M. Sanderson.
Old method:										
No. 1	9.1	9.7	12.0	9.7	12.4	4.9	5.2	6.8	5.7	7.0
No. 2	9.7	9.8	13.1	9.4	11.2	5.7	5.1	6.8	5.1	6.6
No. 3	9.4	9.7	12.8	10.2	11.8	5.1	4.8	6.3	5.7	6.9
No. 4	10.2	9.7	12.6	10.6	11.7	5.7	4.8	7.1	5.7	7.5
No. 5	9.6	8.9	13.5	10.3	12.6	5.9	4.6	6.6	5.5	7.4
Single stalk:										
No. 1	9.5	10.2	12.7	10.3	11.8	6.1	5.3	6.3	5.5	6.7
No. 2	8.9	9.9	11.9	9.6	11.8	5.2	4.9	6.2	5.2	7.0
No. 3	9.9	9.4	11.2	9.8	11.7	5.6	4.6	6.0	6.0	6.3
No. 4	9.5	9.8	12.6	11.1	11.2	5.6	4.8	6.0	7.1	6.6
No. 5	10.6	9.0	12.2	10.1	10.2	5.0	4.4	6.3	5.9	6.0
Average:										
Old method	9.60	9.56	12.80	10.04	11.94	5.46	4.90	6.72	5.54	7.08
Single stalk	9.68	9.66	12.12	10.18	11.34	5.50	4.80	6.16	5.94	6.52

It will be seen from Table XXIII that, while there was considerable variation in the weights of seed representing either of the systems of culture, the average weight of 100 seeds was about the same for each system. This fact, in addition to the fact that there was no significant difference in the percentage of lint, would indicate that the density of lint on the seeds was about the same under the different systems of culture. That is, we would expect to find that the weight of lint per seed did not vary significantly. The figures in the second part of Table XXIII show that such was the case. The lint index, or the number of grams of lint on 100 seeds, is seen to vary only slightly and in direct proportion to the size of seed.

GRADE AND LENGTH OF LINT.

Samples of lint in each of the experiments discussed in connection with Tables XXII and XXIII were submitted to Mr. Fred Taylor, cotton technologist of the Bureau of Markets, for a report on the grade and length of the lint produced by the different systems of culture. Mr. Taylor's report is embodied in Table XXIV.

TABLE XXIV.—*Grade and length of lint of five different varieties of cotton grown under single-stalk and old-method systems of culture in 1915.*

Grower and system of culture.	Grade.	Length of staple.
R. K. Boney:		*Inches.*
Old method	Strict Middling	$\frac{15}{16}$
Single stalk	do	$\frac{15}{16}$
John Hebert:		
Old method	Good Middling	$\frac{31}{32}$
Single stalk	do	$\frac{31}{32}$
J. E. Tanner:		
Old method	do	1
Single stalk	do	$1\frac{1}{16}$
H. D. Sloan:		
Old method	Strict Low Middling	$\frac{15}{16}$
Single stalk	do	$\frac{15}{16}$
L. M. Sanderson:		
Old method	Strict Middling	$\frac{15}{16}$
Single stalk	Good Middling	1

Table XXIV shows that there was practically no difference in the lint from the different systems of culture. In three instances the length of lint was slightly ($\frac{1}{16}$ inch) greater for single-stalk culture, and in two instances the lengths were identical. In no instance did the lint from the old-method samples show any superiority in length or grade over that from the single-stalk samples.

SUMMARY.

Under an informal cooperative agreement with the Office of Extension Work in the South of the States Relations Service, 21 experiments with single-stalk cotton culture were conducted in 1915 in nine parishes and counties of three States, namely, Louisiana, Arkansas, and North Carolina.

These experiments were located in ordinary fields of cotton, single-stalk culture usually being compared with older methods in alternate rows or in alternate blocks of 2, 3, or 4 rows. In one instance the two systems were compared on an acre basis.

In all cases the old-method rows were thinned in the usual manner at the usual time, while the single-stalk rows were thinned later and the plants were left closer together than usual, as is required by this method. In all other respects the rows received identical treatment.

All picking was done under the direction of either the farmer himself or the county or parish agent directly interested and a record of the yields forwarded to Washington.

There was no significant difference in the lint produced by the different systems of culture, the lint percentage, the size of the seed, the lint index (grams of lint on 100 seeds), and the grade and length of lint remaining about the same.

Looking at all of the experiments as a group it is seen that single-stalk culture gave greater total yields in 18 of the 21 instances; it gave greater yields at the first picking in 16 of the 21 instances; it

gave greater yields at the second picking in 9 of 11 instances, and it gave greater yields in the only instances where third pickings were made. While some of the differences are so small as to be insignificant in themselves, there was a general increase throughout the entire series of experiments, in several instances by more than 20 per cent.

Eliminating, for the present, those experiments in which it is known that the thinning of the single-stalk rows was done too late, those in which the stands were generally poor and single-stalk culture was applied to only the short spaces in the rows where the stand permitted the application of the new system, those in which there is no assurance that single-stalk culture was properly applied, and those of which the reports are defective, there remain at least five experiments—three in Louisiana and two in North Carolina—that may be considered as fairly reliable tests of single-stalk culture. The yields of seed cotton from these favored the new system by 20 to 39 per cent.

It is not to be inferred that the particular treatment applied in these experiments is the best development of the single-stalk method or that this method is to be recommended for general application in the States where the experiments were located. The suitability of the new system for any region requires that the local conditions and the behavior of the plants be well understood. How to secure the greatest possible advantage from the control of the branching habits of the plants is a problem worthy of the attention of experimenters who are interested in improving cultural methods with cotton.

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